

# Caltrans Division of Research and Innovation - DRI Deployment Services Business Plan

## **Background**

Transportation research has the potential to provide solutions to critical and long-standing problems. Through applying the knowledge gained and putting into practice the innovations, research activities can also be a means to increase the value of the transportation system's assets, enable better stewardship of the resources required to accomplish the tasks at hand, and enhance the safety of the infrastructure and its operations.<sup>1</sup>

According to state estimates, over 100 million dollars are invested annually to produce research innovations and improvements to the transportation system in California. However, the benefits of these investments are dependent upon the ability to deploy and implement the results of research – the innovations, technologies, new methods, and procedures.

With such investment, it is critical to systematically put into practice deployment oriented research strategies. Consider that without a plan to deploy innovations or a marketing strategy, labor, equipment, materials and other physicals costs can multiply rapidly. Additionally, the costs are even greater for not having a deployment plan in place and not realizing the full benefits of the innovations, and also not having an efficient capability to share best practices.<sup>1</sup>

## **Areas of Deployment Service**

This plan will focus on **Deployment**, which can be defined as: The systematic process of distributing an innovation for use within an organization. An innovation, within the context of this document, is a procedure, product, or method that is new to the adopting organization. The item may be a result of research or may be a new application of an existing improvement that has been used in another context or other organization.<sup>1</sup>

Deployment planning should be included in the research process from beginning to end, and should not be thought of as something that occurs once the research project is completed. It should be considered and occur from stage 1 problem statement and proposal development, through final stage 5, full deployments.

The Caltrans' **Five Stages of Research Deployment**<sup>2</sup> (Attachment A) describes the common elements included under each of the 5 deployment stages. Deployment for the purposes of this plan implies a relatively broad use, rather than pilot, demonstration, or incidental use of the innovation, as described in stages 2 through 4 of the Caltrans 5 Stages of Research Deployment.<sup>2</sup>

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<sup>1</sup> Technology Transfer Toolbox Scoping Study - Final Report for FHWA and TRB Prepared by B. T. Harder, 7/6/2004

<sup>2</sup> DRI Deployment Group, December 2003

# Caltrans Division of Research and Innovation - DRI

## Deployment Services Business Plan

The DRI Research Deployment Branch has initially identified five areas of service where it can be of assistance with regard to a systematic approach to the deployment of research.

### ***1. Research deployment process expertise and project specific guidance and mentoring***

The DRI Research Deployment Branch is working towards creating a knowledge base and expertise in research deployment, and developing a deployment process that can be broadly applied by project managers. The branch through this effort would also provide mentoring and be able to assist project managers with deployment specific recommendations for their projects.

As part of an ongoing effort to improve the DRI Research Process, the DRI Research Deployment Branch will provide deployment specific recommendations and content to be included as part of the research development process from beginning to end. This will include the selection, oversight and tracking of deployed systems.

### ***2. Research proposal and deployment plan review***

The DRI Research Deployment Branch will assist researchers with research proposal and deployment plan review. The branch will provide comments and feedback in the form of possible formats, and required proposal and deployment plan content. The Caltrans' **Five Stages of Research Deployment**<sup>2</sup> (Attachment A) ought to be a primary guideline when considering research deployment plan development.

### ***3. Research deployment training for Project Managers***

The DRI Research Deployment Branch is participating in DRI's Training Team to develop a DRI Training Plan as part of a Professional Capacity Development effort. This training will be conducted with in-house, academia and private sector experts.

The training plan will include Project Management, Research Methods, Staff Technical Enhancement and ***Deployment Strategies*** training. The DRI Training Team in its preliminary organizational assessment and gap analysis identified these four key areas, and the top three priorities within each area. This effort is aimed at creating organizational consistency and continuity with regard to how research is managed, conducted and deployed. Although the Training Team is defining the details and approach, the Deployment Branch is the likely lead for implementing and administering Deployment Strategies training.

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<sup>1</sup> Technology Transfer Toolbox Scoping Study - Final Report for FHWA and TRB Prepared by B. T. Harder, 7/6/2004

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#### ***4. Research project deployment status reports to DRI Management Staff and Project Managers***

The DRI Research Deployment Branch will report to DRI Management on the quality of the deployment program. The branch will work with research project managers to gather, monitor and track deployment status and report deployment trends. The branch will prepare summary reports, and provide deployment updates and presentations to DRI management staff and project managers on a regular basis.

Deployment of transportation research has become a national priority. The Technology Transfer Toolbox Scoping Study<sup>1</sup> recently completed under the auspices of the Federal Highway Administration (FHWA) is the first step towards making deployment planning an integral part of the research process. The DRI Research Deployment Branch will solicit and gather feedback from researchers as to the effectiveness and quality of the DRI Deployment effort and report this feedback in an objective and ongoing manner to DRI Management staff.

#### ***5. Depository of deployment related success stories and lessons learned***

The DRI Research Deployment Branch proposes to be the depository of DRI deployment related successes and lessons learned, much like the Transportation Research Board publication, TR News. The branch would be the disseminator of this information to DRI and other Caltrans staff through internal email, the Caltrans Newsletter or the TRB Newsletter.

#### **6. System Engineering**

In 2001, the USDOT issued a new regulation that requires a systems engineering approach to the implementation of Intelligent Transportation Systems (ITS). FHWA issued 23 CFR 940 that requires all ITS projects funded with highway trust funds to be based on a systems engineering analysis. The Systems Engineering Handbook is a reference to help practitioners develop: Requests for Proposals, applicable industry standards, and roles and responsibilities in project development. The DRI Research Deployment Branch proposes to use the Systems Engineering Handbook as a guideline for ITS deployable projects.

### **Resources**

The DRI Deployment Branch is made up of four DRI staff as follows:

**Juan Araya** – Senior Transportation Engineer-Electrical, Branch Chief

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**Mike Jenkinson** – Liaison to: Maintenance PSC, Right of Way/Land Surveys PSC, Transportation Safety and Mobility PSC

**Todd LaCasse** – Liaison to: Modal PSC, Planning/Policy/System Information PSC, Out-of-the Box PSC

**Kamal Sah** –Liaison to: Environmental PSC, Pavement PSC, Design PSC, Geotechnical/Structures PSC

To leverage limited staff resources, the DRI Deployment Branch works closely with the California Center for Innovative Transportation (CCIT). CCIT's mission is to facilitate and accelerate the development, commercialization and deployment of promising transportation technologies and systems that are developed by all the centers funded by Caltrans. CCIT's role will include involvement in research projects during all five stages of deployment.

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## *Attachment A*

### Caltrans 5 Stages of Research Deployment

#### **1. CONCEPT STAGE**

- First steps following Problem Statement and Proposal
- Includes detailed literature search
- Involves experimental design, data collection, analysis and reporting
- Assesses results of research
- Defines barriers to implementation (e.g. policies, specifications, standards)
- Submits a Final Report and outlines a recommended implementation plan

#### **2. LABORATORY PROTOTYPE STAGE**

- Develops breadboard circuit or computer system modeling
- Demonstrates operation in laboratory setting
- May incorporate customized or one of a kind components
- Assesses results
- Submits Final Report and recommends design of full scale demonstration

#### **3. CONTROLLED FIELD DEMONSTRATION STAGE**

- Prepares for full scale testing of demonstration project
- Includes collaboration with outside agencies or other state DOTs and US DOT
- Controlled tests at specialized facilities are observed and supported by cooperating agencies, industry and technical associations
- Potential end users are enlisted to support the field pilot stage
- Assesses results
- Submits Final Report and recommends site/conditions for first application pilot stage

#### **4. FIRST APPLICATION (CONTRACT) FIELD PILOT STAGE**

- Works with potential end users to select site and to conduct pilot testing under real world operating conditions
- Test specifications and standards are developed
- Research assistance given to assure proper installation and operation
- Problems are corrected and adjustments made, as necessary, to complete pilot testing
- To the extent possible, potential end users operate the project under careful research surveillance
- Assesses results
- Submits Final Report and recommends initial sites for full corporate deployment

#### **5. SPECIFICATION & STANDARDS WITH FULL CORPORATE DEPLOYMENT STAGE**

- End users select site(s) and deploy the method/process/equipment using resident management, supervision, staff, and contracting forces (where applicable)
- Deployment is without research supervision or direction
- On call assistance is available upon request
- Assesses results